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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 : A01M 1/24, 17/00

A1

(11) International Publication Number: WO 90/14004

(43) International Publication Date: 29 November 1990 (29.11.90)

(21) International Application Number: PCT/AU90/00200

(22) International Filing Date: 16 May 1990 (16.05.90)

(30) Priority data:
PJ 4198 16 May 1989 (16.05.89) AU

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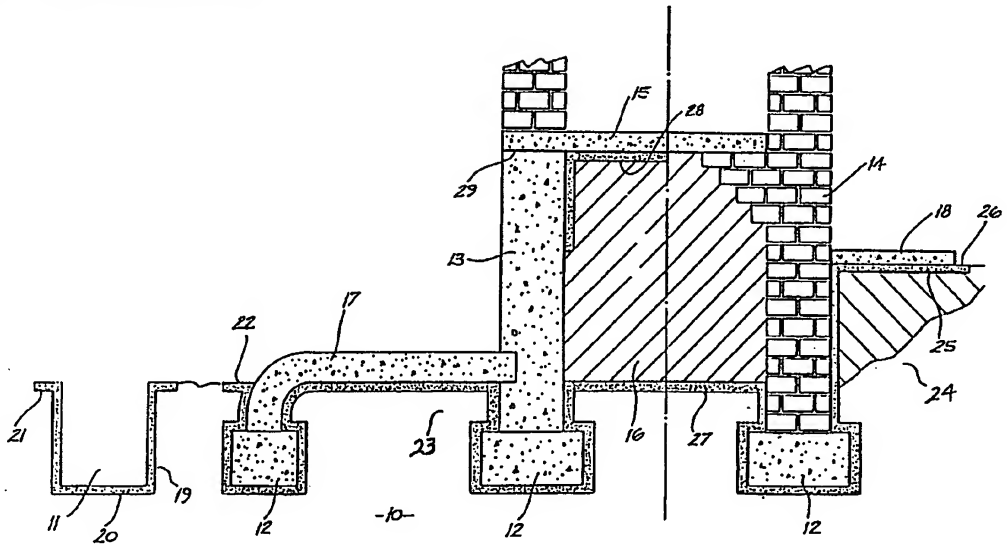
(81) Designated States: AT (European patent), AU, BE (European patent), CH (European patent), DE (European patent)*, DK (European patent), ES (European patent), FR (European patent), GB (European patent), IT (European patent), JP, KR, LU (European patent), NL (European patent), SE (European patent), US.

Published
With international search report.

(54) Title: PESTICIDAL BLANKET



(57) Abstract

The invention provides a method for controlling the infestation of buildings and/or other articles from subterranean pests, which method comprises: laying a flexible untreated blanket on or adjacent to a strata on which the building is to be constructed or where the article is to be located, applying pesticide or pest repellant in liquid form to the blanket, then constructing the building or locating the article in proximity to the blanket. The pesticide or pest repellant may be applied by spraying or the like to the blanket installed in its final location or adjacent its final location followed by moving the blanket to its final location after application of pesticide or pest repellant. In cases where the pesticide or pest repellant is non-toxic and non-inflammable it may be applied at any time between manufacture of the blanket and constructing the building or locating the article to be protected.

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PESTICIDAL BLANKET

Technical Field

This invention pertains to an apparatus and method for controlling the infestation of buildings with pests, and more particularly to a termiticidal blanket which is laid under a building structure and a method for its deployment.

Background Art

Subterranean termites are responsible for most of the termite damage of economic importance to timber in Australia. Termites will seek out any material containing cellulose, their principal food. Typically, termite colonies form nests underground in the soil near ground level or in a stump or other source of timber or in the trunk of a living tree. Colonies may persist for years and could contain a population running into millions. Attacks by subterranean termites originate from the nest. Timber lying or buried in the ground may be reached by underground foraging galleries but attacks may occur well above ground level into structures sitting on the ground.

Both the building and its contents can receive significant protection by means of a chemical soil barrier which prevents termites, attacking from the soil, from reaching the superstructure. The conventional practice is to treat the soil surrounding a building foundation and footing with any one of a number of well known chemicals. Chemicals such as aldrin, chlordane, dieldrin and heptachlor may be sprayed on the soil surface by low pressure spray equipment. Vertical chemical barriers must be installed by excavating trenches, treating the exposed trench and refilling with treated soil or by rod injection. The use of the aforesaid chemicals in treating soil around building sites is outlined in Australian Standard 2057-1986, entitled "Protection of Buildings from Subterranean Termites - Chemical Treatment of Soil for Buildings Under Construction", published by the Standard Association of Australia, Standards House, 80 Arthur Street, North Sydney, New South Wales.

In addition to spraying soil with toxic chemicals, others have proposed insecticidal barriers and in particular barriers against termites which are used in conjunction with building structures.

US Patent No. 2 889 771 discloses a flexible vapour barrier carrying a layer of a water emulsifiable insecticide. The insecticide is carried in a flexible relatively thin water soluble substance such as "Polyox".

US Patent No. 2 139 225 shows a paper which is coated with arsenate

of lead mixed into a paint in which mineral pitch or asphalt is the base. A felt paper in sheet form is impregnated with the mixture which is applied to one or both surfaces of the paper. After the paper has dried, it is packaged and thereafter can be used whenever desired in the same manner as ordinary felt paper, i.e. it can be laid under floors or placed between foundations and superstructures or between the walls of buildings and the roofs.

US Patent No. 4 103 450 shows a lofty, open, low-density web impregnated with an insecticidal substance. The web is formed of randomly disposed crimped or looped synthetic fibres, bonded together, and impregnated with insecticidal substances such as pyrethrum, endrin, DDT, DDD or any one of a number of other insecticides.

One problem associated with prior art insecticidal barriers such as that disclosed by US 2 889 771, US 2 139 225 or US 4 103 450 is that the material, once impregnated, must be stored before it is applied at a building site. The impregnated materials, when stored in large quantities (as would be required for a commercial or residential building) pose a significant safety, health and fire hazard. Further, such materials should be laid by a professional pest control operator. The alternative offered by the prior art, that is, toxification of soil, is less than optimal because any disturbance to the soil, by construction workers or otherwise, has the effect of disturbing the insecticidal barrier. Further, once soil is toxified it is difficult to identify and remove, if required.

Object of the Invention

The object of the invention is to provide a method for laying an improved insecticidal barrier.

Disclosure of the Invention

The invention provides a method for controlling the infestation of buildings and/or other articles from subterranean pests, which method comprises: laying a flexible untreated blanket on or adjacent to a strata on which the building is to be constructed or where the article is to be located, applying pesticide or pest repellant in liquid form to the blanket, then constructing the building or locating the article in proximity to the blanket.

The pesticide or pest repellant can conveniently be applied by spraying or the like to the blanket installed in its final location or adjacent to its final location where the blanket is moved to its final location following application of pesticide or pest repellant. Where a

non-toxic and non-inflammable pesticide or pest repellant is employed, it may be applied to the blanket at any time as such a treated blanket would not be hazardous when handled or in storage.

The blanket may be any material capable of absorbing liquid pesticide or pest repellant and which is sufficiently durable to remain intact in situ for the life of the building or article which it is intended to protect.

Thus, the blanket can be made of any of a number of absorbent materials of a generally fibrous nature such as hessian "coconut matting", cotton compounds, synthetic carpet-like materials, "underfelt"-like materials, woven or nonwoven absorbent polymeric fibres, etc. The blanket material should be rot resistant. Providing a rot resistant blanket material offers the added advantage of allowing easy identification of insecticide bearing material which would be of great ecological benefit, for example by facilitating detoxification of a site after a building is demolished.

The preferred blanket for use in the present invention is a nylon polyester blend. The fibres from which the blanket is manufactured are preferably less than 3 denier. Satisfactory blankets have been made from fibres of 1.5 to 3 denier, however, better blankets could be made from finer fibres.

The blankets can be made by any known process including by weaving, needle punching and the like.

The most preferred blankets are of a multilayer structure in which the topmost layer or outer layers are such as to provide for easy wicking of the liquid pesticide or pest repellant and the bottom or innermost layer or layers are such as to retain the pesticide or pest repellant.

The pesticide or pest repellant employed in the method of the invention will depend on the subterranean pests which are known to occur or which may occur at the site to be protected. For protection from termites, aldrin, dieldrin, heptachlor and chlordane are registered in Australia. Chlorpyrifos is registered for use in the USA. Other active ingredients such as the synthetic pyrethroids and organophosphorous pesticides and pest repellants can be used in the practice of the present invention. They include permethrin, deltamethrin, cypermethrin, allethrin, fenitrothion, prothiophos and the like.

The amount of pesticide or pest repellant applied to the blanket will depend on the absorbability of the blanket. Considerably less amounts than

are presently applied to the soil can be used to effectively protect buildings and other articles according to the invention. Buildings and other articles can be protected by the method of the present invention using 25% or less pesticide or pest repellant than is necessary when applied directly to the soil.

As the method of the present invention enables the pesticide or pest repellant to be contained and concentrated in the blanket, there is a considerable environmental advantage in that lesser amounts of pesticide or pest repellant can be employed and pesticides or pest repellants which are less toxic to man and the environment can be used.

The liquid pesticide or pest repellant formulation applied to the blanket may conveniently include a dye to indicate that pesticide or pest repellant has been applied to the blanket. It may also include materials such as bactericides, buffers, antioxidants and the like to protect the pesticide or pest repellant from breakdown.

If desired, a sample of the treated blanket may be taken for analysis before the building is constructed to ensure that adequate amounts of pesticide or pest repellant have been applied. At present, where pesticide or pest repellant is applied to the soil, it is not possible to control accurately the amount applied. As different soil types absorb and react with the pesticide or pest repellant differently, it is difficult to apply sufficient pesticide or pest repellant without wastage. It appears that current methods rely on overtreatment with pesticide or pest repellant, whereas the present invention allows adequate treatment to be acheived with the minimum amount of pesticide or pest repellant.

It should be understood that the criteria for selecting a blanket material, and an insecticide are relatively permissive.

In particular, any termiticide which is registered or recognised by a governmental body for the purpose of application at a building construction site would be suitable.

It is also said, with reference to the present invention, that building construction occurs after the application of liquid insecticide on the blanket, and in proximity thereto. The term "proximity" is used because the wide variety of ground level building elements and building precursors such as foundations, external walls, piers, various fills, pads, grade lines, footings, concrete structures and brickwork, prevent the use of terminology from which the structural relationship between the laid blanket and building element could be better defined in the broadest

sense. What is meant by "proximity", is that an effective barrier is created between a building element and the treated blanket. No one method of applying the treated blanket is intended to cover all building types, techniques and constructions, however the teachings of the present invention are intended to convey a suitable methodology for most building situations which would be easily adaptable to other situations by one of ordinary skill in the art of pest control.

Brief Description of the Drawings

Figure 1 illustrates how the present invention may be applied to a variety of building structures.

Figure 2 illustrates the preferred blankets which can be used in the method of the present invention.

Figure 3 illustrates how the invention may be applied to power poles, fence posts and the like.

Figure 4 illustrates how the invention may be applied to subterranean cables, conduits and the like.

Best Mode for Carrying out the Invention

It should be understood that the present inventive method for protecting buildings from subterranean termites is essentially an improvement over the method described in Australian Standard 2057-1986 referred to above. The present method can be used in any instance where Australian Standard 2057-1986 would be applicable, however certain benefits are offered by the utilization of the instant method. The principle difference is that in place of directly spraying the exposed soil of an excavated building site, the present method calls for the laying of a blanket over the excavated soil, followed by spraying of the blanket.

As seen in Figure 1, and by way of example, a building site consists of terrain 10 which is prepared for the building to be constructed. After the ground has been suitably levelled, a series of trenches or holes 11 are dug for pouring concrete footings or foundations 12. Concrete 13 or brick 14 structures are erected on the footings. Concrete slabs 15, 17 may be poured over fill 16 or directly over the ground 10. A footpath 18 is seen as extending outwardly from a brick retaining wall 14. The principle of the present invention is to create an improved barrier between the soil and the aforesaid building elements which is noxious to subterranean termites.

For example, a trench 11 is excavated for pouring a concrete footing. The prior art method calls for direct spraying of the soil in the trench with an aqueous emulsion of about 5 grams per litre of one of the

substances such as aldrin or dieldrin disclosed in Australian Standard 2057-1986. The present method calls for laying a blanket 20 in the trench 11, thus forming a liner. It should be understood that as of the time the blankets are laid around building sites or in trenches, they are free of pesticidal material. The blanket rolls over the top of the trench forming a lip 21 which lies along the excavation surface at ground level.

Present methods require the soaking of the bedding sand to a depth of up to 150 mm, thus requiring the removal of tons of sand from a "contaminated" or treated site. It is preferred that blanket material be somewhat stronger or thicker around an excavation perimeter or a lip 21 thus offering resistance to wear where it is exposed to pedestrian traffic or other forms of transient stress. Blanket material 19 laid in a trench 11 also offers the advantage of providing a degree of protection to the form of the excavated trenches, as the blankets will stop the slippage of sand until such a time as the footings are poured.

In a similar fashion, untreated blanket material 22 is laid over untreated soil adjacent an exterior poured concrete slab 17 or under a concrete slab 23, or between retaining walls 14 and the underlying soil 24. Untreated blanket material 25 may be deployed beneath pavements and footpaths. Note that when laid under a pavement or footpath 18 the underlying barrier 25 also includes a perimeter 26 which extends beyond the width of the pavement. A building structure which includes fill material 16 must be protected so that subterranean termites cannot infiltrate the building through the fill. For example, a blanket material 27 can be laid on top of the underlying ground and beneath the fill. In the alternative, and in particular where cast or poured concrete structures 13, 15 surround the land fill, a blanket barrier 28 can be erected over the fill material and adjacent any seams or joints 29 between poured structures 13, 15.

It can be seen, by comparing the length of blanket material to the spraying of soil with respect to Australian Standard 2057-1986, that untreated blankets are laid about an excavation site in the same locations that aqueous emulsions would be sprayed directly onto the soil under similar circumstances. Note that because the blanket material does not contain at the time that it is laid, a pesticidal material, it need not be laid by a pest control operator.

The blanket is only sprayed with pesticidal material after it is laid. In contrast to the practice described in Australian Standard 2057-1986, termiticidal material is sprayed in higher concentrations.

Standard practice calls for about 5 grams per litre of pesticide or pest repellant. The present invention allows for about a five fold increase in concentration. The standard practice is to spray five litres per square metre of soil for horizontal barriers. Because the present method provides for the treatment of a blanket rather than a large volume of soil, a substantially more concentrated solution is preferred. The object is to deposit approximately the same total amount of insecticidal material per unit area. Thus a 25 gram per litre solution is sprayed at a deposit rate of approximately 1 litre per square metre of blanket material. Under the prior art method, soil had to be well soaked or penetrated with dilute insecticide because if the soil barrier were disturbed, an opportunity would be created for termite penetration into the building structure. Under the present method, the blanket retains its integrity even as building construction proceeds on top of it and around it. A dye solution mixed with the aqueous emulsion of insecticide allows the pest control operator to see precisely what areas of the blanket have been sprayed, thus ensuring uniform and unduplicated deposition of insecticide material.

The blanket may also be laid between the waterproof membrane and the building element. This is especially useful when applying a pesticide or pest repellant which interacts with the soil. In such cases, the waterproof membrane is laid over the excavation and is overlaid with the blanket prior to application of the pesticide or pest repellant. Alternatively, a laminate of waterproof membrane and blanket may be employed.

In summary, the preferred method of the present invention comprises the following steps. A building site is excavated and prepared for building construction in the conventional manner. An untreated absorbent blanket is laid over the untreated ground, in trenches and in those areas where soil would normally be treated according to the prior art practice. After the blanket is laid in position, a termiticidal solution is sprayed onto it. After the blanket has been sprayed, building construction proceeds as if it were proceeding over soil treated by prior art spraying techniques.

Figure 2A illustrates a preferred two layer blanket 20A having a layer 30 adapted for wicking and a layer 31 adapted to retain the pesticide or pest repellant applied. In situations where tradesmen cannot be relied on to lay the blanket with the correct layer uppermost, a three layer blanket 20B can be employed.

Alternate embodiments of the present invention are illustrated in figures 3 and 4. In figure 3, a timber post 40 has been placed into a hole 11 into which a "sock" 41 of blanket material has been placed and treated with pesticide or pest repellant. Alternatively, the sock 41 may be placed over the end of the post 40 and then be treated before the assembly 40,41 is placed into the prepared hole 11. Figure 4 illustrates a cable 50 with insulation 51 which needs to be protected from termites. A cylinder 52 or strip 53 of blanket material is placed around the insulated cable 50,51 and is treated with pesticide or pest repellant before burial in the ground 10.

CLAIMS

1. A method for controlling the infestation of buildings and/or other articles from subterranean pests, which method comprises: laying a flexible untreated blanket on or adjacent to a strata on which the building is to be constructed or where the article is to be located, applying pesticide or pest repellant in liquid form to the blanket, then constructing the building or locating the article in proximity to the blanket.

2. The method of claim 1, wherein the blanket is any material capable of absorbing liquid pesticide or pest repellant and which is sufficiently durable to remain intact in situ for the life of the building or article which it is intended to protect.

3. The method of claim 1 or claim 2, wherein the blanket is of an absorbent material of a generally fibrous nature.

4. The method of any one of claims 1 to 3, wherein the blanket is manufactured from a nylon polyester blend.

5. The method of claim 4, wherein the fibres from which the blanket is manufactured are less than 3 denier.

6. The method of any one of claims 1 to 5, wherein the blanket is of a multilayer structure wherein the topmost layer or outer layers are such as to provide for easy wicking of the liquid pesticide or pest repellant and the bottom or innermost layer or layers are such as to retain the pesticide or pest repellant.

7. The method of any one of claims 1 to 6, wherein the liquid pesticide or pest repellant formulation applied to the blanket includes a dye to indicate that pesticide or pest repellant has been applied to the blanket.

8. The method of any one of claims 1 to 7, wherein the liquid pesticide or pest repellant formulation applied to the blanket includes materials to protect the pesticide or pest repellant from breakdown.

9. The method of claim 8, wherein the materials are bactericides, buffers, antioxidants or the like

10. The method of any one of claims 1 to 9, wherein the pesticide or pest repellant is applied by spraying or the like to the blanket installed in its final location or adjacent its final location followed by moving the blanket to its final location after application of pesticide or pest repellant.

11. The method of any one of claims 1 to 9, wherein the pesticide or

pest repellant is non-toxic and non-inflammable and wherein the pesticide or pest repellant is applied at any time between manufacture of the blanket and constructing the building or locating the article to be protected.

12. The method of any one of claims 1 to 10, wherein the pesticide or pest repellant is one or more synthetic pyrethroid, organochlorine or organophosphorous pesticide or pest repellant.

13. The method of claim 12, wherein the pesticide or pest repellant is aldrin, dieldrin, heptachlor, chlordane, chlorpyrifos or a mixture of two or more thereof.

14. The method of claim 12, wherein the pesticide or pest repellant is permethrin, deltamethrin, cypermethrin, allethrin or a mixture of two or more thereof.

15. The method of claim 12, wherein the pesticide or pest repellant is fenitrothion or prothiophos.

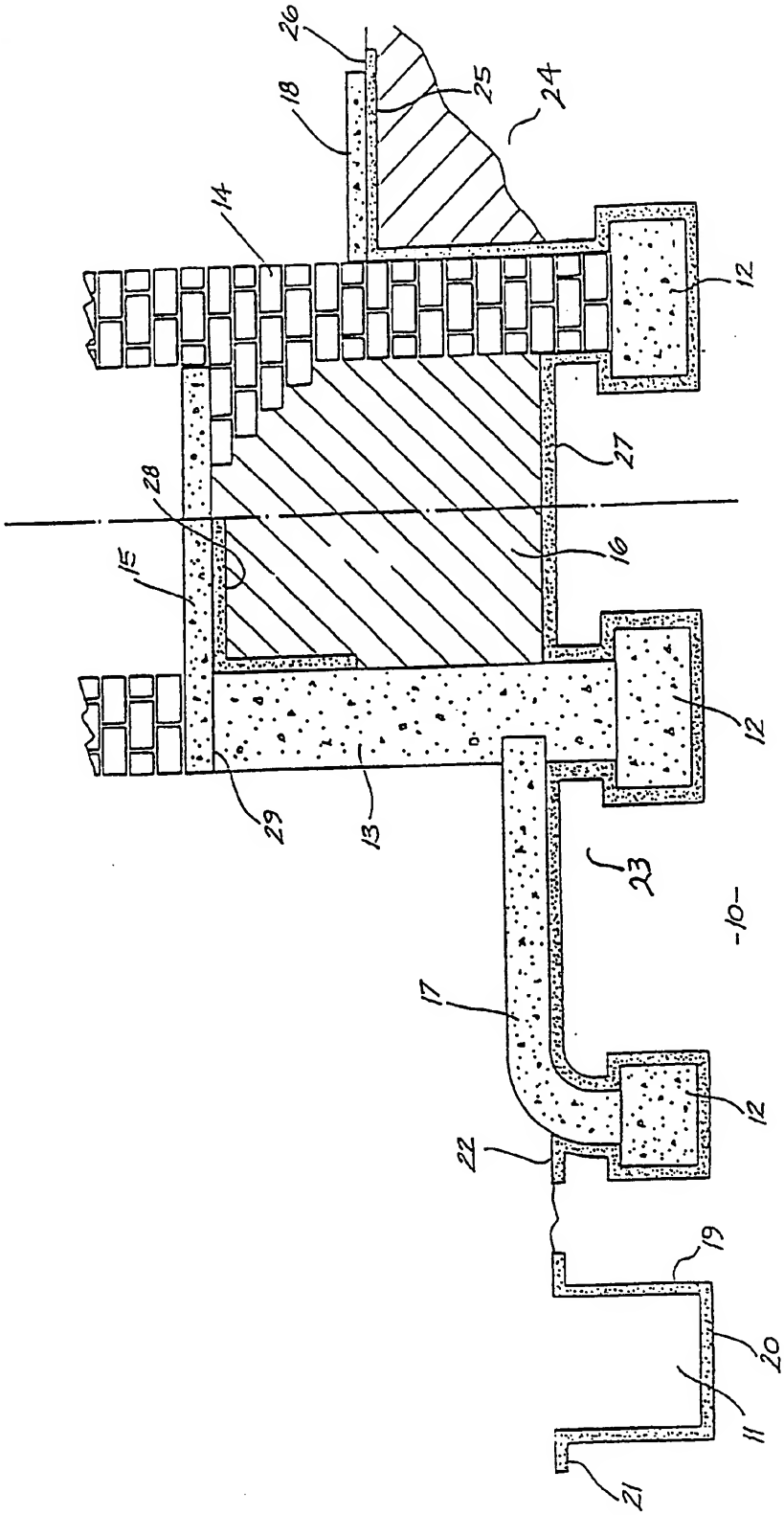

FIG. 1

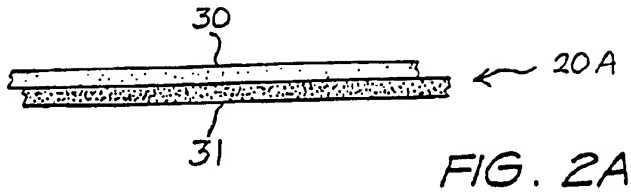

FIG. 2A

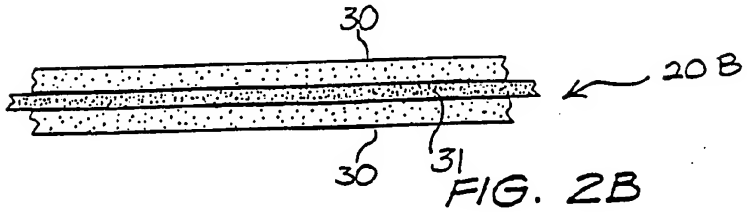

FIG. 2B

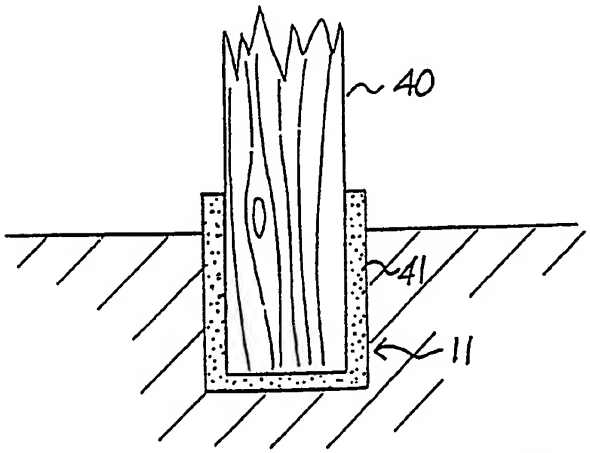

FIG. 3

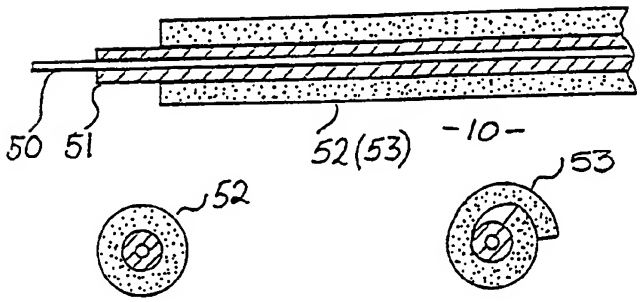

FIG. 4

INTERNATIONAL SEARCH REPORT

International Application No. PCT/AU 90/00200

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) 6

According to International Patent Classification (IPC) or to both National Classification and IPC

Int. Cl.[5] A01M 1/24, A01M 17/00

II. FIELDS SEARCHED

Minimum Documentation Searched 7

Classification System	Classification Symbols
IPC	A01M 1/24, A01M 17/00

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched 8

AU: IPC as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT 9

Category*	Citation of Document, 11 with indication, where appropriate, of the relevant passages 12	Relevant to Claim No 13
A	AU-B-60111/86 (583405) (C.A. VENEMA) 5 February 1987 (05.02.87)	1
A	DERWENT ABSTRACT ACCESSION NO. 89-237318/33 Class P14 JP,A,01-171425 (DAICEL CHEM IND KK) 6 July 1989 (06.07.89)	1
A	PATENTS ABSTRACTS OF JAPAN, M366, page 95, JP,A, 59-199921 FUKUBI KAGKU KOGYO K.K.) 13 November 1984 (13.11.84)	1

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
3 August 1990 (3.8.90)	20 August 1990
International Searching Authority	Signature of Authorized Officer
Australian Patent Office	B.R. DASHWOOD

Form PCT/ISA/210 (second sheet) (January 1985)